

CBRs were generally in the forties and CDRs in the twenties. The large gap between births and deaths most years produced a high NIR typical of stage 2 of the demographic transition, yet Cape Verde remained in stage 1 until 1950, because several severe famines dramatically disrupted the typical patterns of birth, death, and natural increase. For example, famine made Cape Verde's CDR rocket to 74 per 1,000 in 1941 and 101 in 1942. Because fewer babies were conceived at the height of the famine in 1942, the CBR fell in 1943 to only 22. Population also declined during periods of famine because survivors migrated to other countries. Wide fluctuations in the crude birth and death rates from one year to the next, depending on economic and environmental conditions, are typical of stage 1 countries.

This long-term pattern of demographic uncertainty suddenly ended in 1950, and Cape Verde quickly moved to stage 2 of the demographic transition. Since entering stage 2 a half-century ago, the population of Cape Verde has tripled to more than 400,000, and natural increase has averaged around 3.0 percent per year.

Cape Verde moved on to stage 2 when an antimalarial campaign was launched. The CDR dropped by more than one-third between 1949 and 1950, from 27 to 17 per 1,000. It further declined during the 1950s and 1960s to about 10 per 1,000. Since the early 1970s, the CDR has changed very little, under 10 most years, although a drought in 1971 and a famine in 1986 temporarily lifted the rate above 10 (Figure 2-17).

Meanwhile, as is typical of stage 2 countries, Cape Verde's CBR has remained relatively high and still fluctuates wildly. The CBR increased in the early 1950s to a maximum of 53 per 1,000 in 1954, declined during the 1960s and 1970s to below 30, increased during the 1980s back above 40, and settled during the 1990s and early twenty-first century in the upper 30s.

The wild fluctuations in Cape Verde's CBR are a legacy of the severe famine during the 1940s. Birth rates were lower during the 1960s because Cape Verde had relatively few women in their twenties, the prime childbearing years. Women in their twenties during the 1960s would have been born during the 1940s, when the famine kept birth rates very low. Similarly, the

decline in the birth rates during the 1990s reflects the small number of women in prime childbearing years, who would have been born during the 1960s and 1970s. Conversely, the higher birth rates in the 1950s and 1980s resulted from a larger number of women in their childbearing years.

The population pyramid shows that Cape Verde has a large number of females age 5–14 who will soon start moving into their prime childbearing years. For Cape Verde to enter stage 3 of the demographic transition during the next decade, these females must bear considerably fewer children than did their mothers.

Chile: Stage 3 (Moderate Growth)

Chile provides an example of a country outside Europe and North America that has reached stage 3 of the demographic transition but is likely to take some time before continuing to stage 4. Chile has changed from a predominantly rural society based on agriculture to an urban society, in which most people now work in factories, offices, and shops. However, many Chileans still prefer to have large families.

Like most countries outside Europe and North America, Chile entered the twentieth century still in stage 1 of the demographic transition. Population had grown modestly during the nineteenth century at a NIR of less than 1 percent per year. However, much of Chile's population growth—as in other countries in the Western Hemisphere—resulted from European immigration.

Chile's CDR declined sharply in the 1930s, moving the country into stage 2 of the demographic transition. As elsewhere in Latin America, Chile's CDR was lowered by the infusion of medical technology from MDCs such as the United States, bringing under control such diseases as smallpox, malaria, and dysentery. During the 1940s and 1950s Chile's rate of natural increase exceeded 2 percent per year, and the CDR dropped from the mid-30s to less than 15 (Figure 2-18).

Chile has been in stage 3 of the demographic transition since about 1960. The CDR declined further during the 1960s and 1970s to less than 10, while the CBR dropped sharply, from about

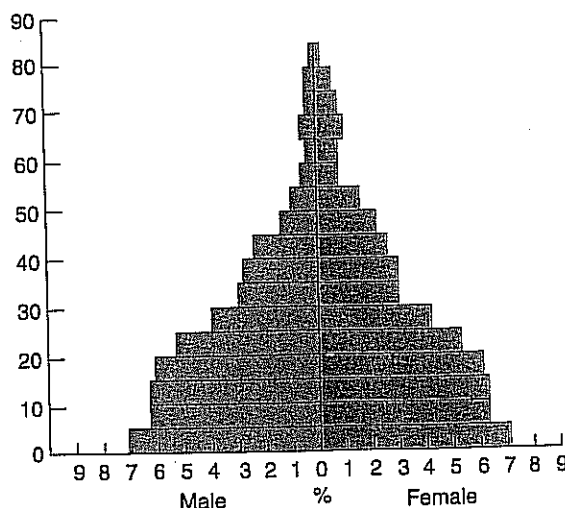
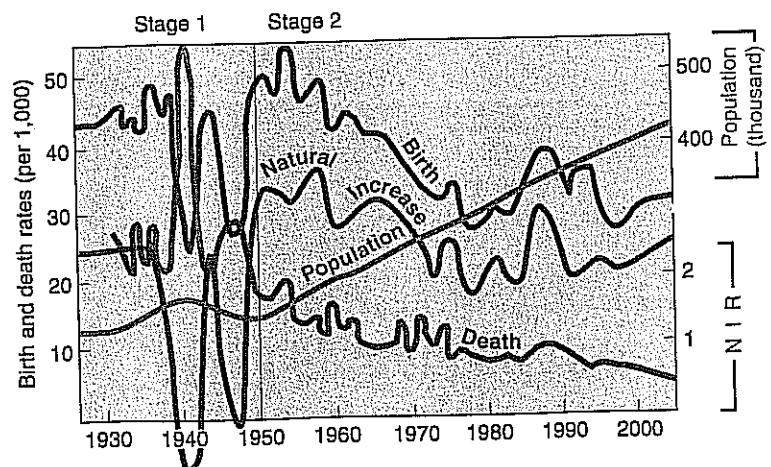


FIGURE 2-17 Demographic transition and population pyramid for Cape Verde. Cape Verde entered stage 2 of the demographic transition in approximately 1950, as indicated by the large gap between birth and death rates since then. As is typical of countries in stage 2 of the demographic transition, Cape Verde has a population pyramid with a very wide base.





CONTEMPORARY GEOGRAPHIC TOOLS

Spatial Analysis and the Census

Geography relies on statistical data to conduct spatial analysis. The single most important data source for human geographers is the **census**. In the United States a census of population and a census of housing take place once a decade, in years ending in zero. Censuses of various types of businesses are undertaken once every 5 years. Canada, the United Kingdom, and a number of other countries once ruled by the British take the census every 10 years, in years ending in the numeral one. The French average 7 years between censuses, but the government decrees exactly when each will be done. Other countries take a census on an irregular basis (Figure 2-1.1).

In 2000 the U.S. Bureau of the Census sent to every address a form asking to identify the race, age, and gender of everyone in the household. One-sixth of the households received a longer form asking for detailed information about the people and the dwelling. Statistical methods can be used to make generalizations about the entire population on the basis of information concerning the one-sixth who received the more detailed questionnaire. Census takers visited people who did not mail back the form by April 1.

Not everyone completes the census form. Noncompliance is especially high in inner-city neighborhoods, especially among homeless people, ethnic minorities, and citizens of other countries without proper immigration documents. These individuals may hold particularly strong suspicions about the confidentiality of the census form—they fear that the Bureau of the Census may turn over the forms to another gov-

ernment agency, such as the FBI or the Department of Homeland Security.

Because of a low rate of return among inner-city residents, the census may severely undercount a city's total population. This matters to cities, because maps must be redrawn after each census so that each district in the U.S. House of Representatives has about the same number of people. The districts for the 50 state legislatures are also redrawn each decade on the basis of equal population. The lower the population is in the city, the fewer the seats, and, therefore, the lower the voice in the legislature. Also, the U.S. and state governments allocate many types of funds to communities on the basis of population.

In response to the widely recognized undercounting of the urban population, geographers, census bureau officials, and other social scientists

interested in spatial analysis are able to apply statistical techniques to get an accurate count, as well as to determine other characteristics of people, housing, and businesses. However, spatial analysis is opposed by people who claim that Article 1, Section 2 of the U.S. Constitution requires a 100 percent count. As a "compromise," congressional and state legislative seats are redrawn using the 100 percent counts, whereas analysis of spatial patterns and trends is conducted with statistically valid samples.

Political self-interest has heavily influenced the debate over spatial analysis. Politicians sympathetic to the needs of inner-city residents have been especially vocal in support of sampling, whereas those from other constituencies are more inclined to support the 100 percent requirement.

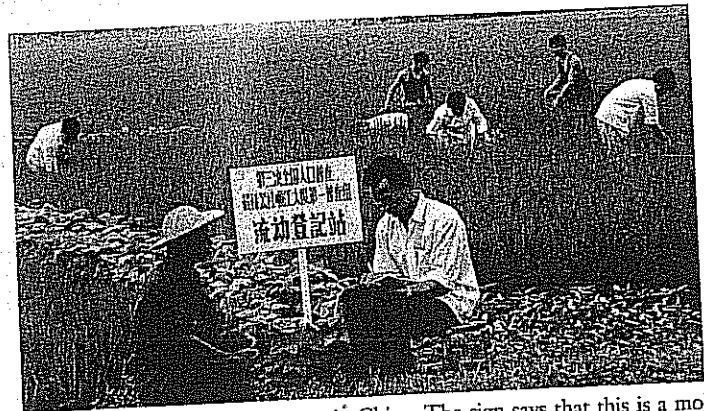


FIGURE 2-1.1 Taking the census in China. The sign says that this is a mobile census-taking operation.

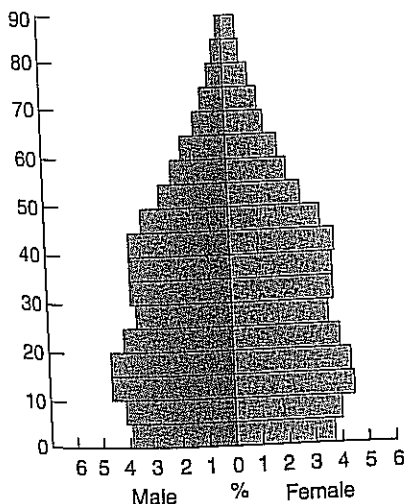
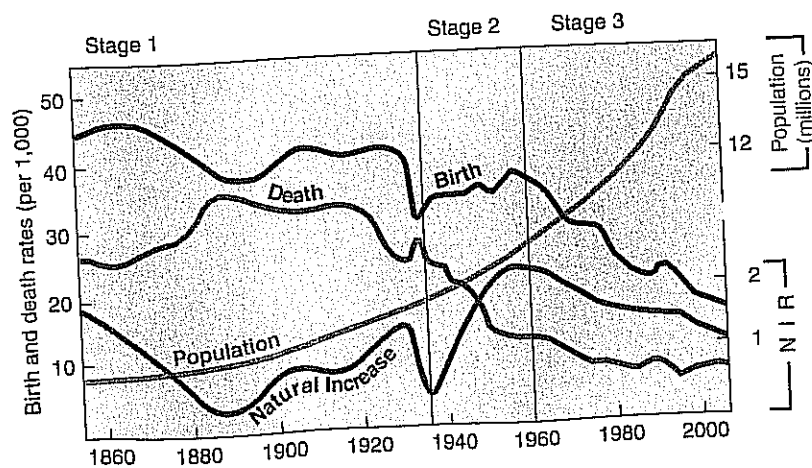


FIGURE 2-18 Demographic transition and population pyramid for Chile. Chile entered stage 2 of the demographic transition in the 1930s, when death rates declined sharply, and stage 3 in the 1960s, when birth rates declined sharply. Since then, birth rates have no longer declined, and Chile's natural increase rate has remained about 1.5.



35 in the early 1960s to about 20 by the late 1970s and the upper teens in the 2000s. However, Chile has failed to make further progress over the past four decades in reducing the gap between births and deaths. The NIR has remained well above 1 percent.

Chile moved on to stage 3 of the demographic transition primarily because of a vigorous government family-planning policy, initiated in 1966. Reduced income and high unemployment at that time also induced couples to postpone marriage and delay childbearing.

Although Chile's NIR is lower today than in the 1950s, the country is unlikely to move into stage 4 of the demographic transition in the near future. Chile's government reversed its policy and renounced support for family planning during the 1970s. The government policy was that population growth could help promote national security and economic development. Further reduction in the CBR is also hindered by the fact that most Chileans belong to the Roman Catholic Church, which opposes the use of what it calls artificial birth-control techniques.

Denmark: Stage 4 (Low Growth)

Denmark, like most Western European countries, has reached stage 4 of the demographic transition. Denmark's history is similar to that of England's, already discussed. The country entered stage 2 of the demographic transition in the nineteenth century, when the CDR began its permanent decline. The CBR then dropped in the late nineteenth century, and the country moved on to stage 3 (Figure 2-19).

Since the 1970s the CBR and the CDR have been roughly equal, about 12 per 1,000. The country has reached ZPG, and the population is increasing almost entirely because of immigration.

Denmark's population pyramid shows the impact of the demographic transition. Instead of a classic pyramid shape, Denmark has a column, demonstrating that the percentages of young and elderly people are nearly the same. With further medical advances, the number of elderly people may actually exceed the number of young people in a few years. Denmark's

CDR has actually increased somewhat in recent years because of the increasing number of elderly people. The CDR is unlikely to decline unless another medical revolution, such as a cure for cancer, keeps older elderly people alive much longer (see Global Forces, Local Impacts box).

Demographic Transition and World Population Growth

Worldwide population increased rapidly during the second half of the twentieth century because few countries were in the two stages of the demographic transition that have low population growth—no country remains in stage 1, and few have reached stage 4. The overwhelming majority of countries are in either stage 2 or stage 3 of the demographic transition—stages with rapid population growth—and only a few are likely to reach stage 4 in the near future.

The four-stage demographic transition is characterized by two big breaks with the past. The first break—the sudden drop in the death rate that comes from technological innovation—has been accomplished everywhere. The second break—the sudden drop in the birth rate that comes from changing social customs—has yet to be achieved in many countries. If most countries in Europe and North America have reached—or at least are approaching—stage 4 of the demographic transition, why aren't countries elsewhere in the world? The answer is that fundamental problems prevent other countries from replicating the experience in Europe and North America.

The first demographic change—the sudden decline in CDR—occurred for different reasons in the past. The nineteenth-century decline in the CDR in Europe and North America took place in conjunction with the Industrial Revolution. The unprecedented level of wealth generated by the Industrial Revolution was used in part to stimulate research by European and North American scientists into the causes and cures for

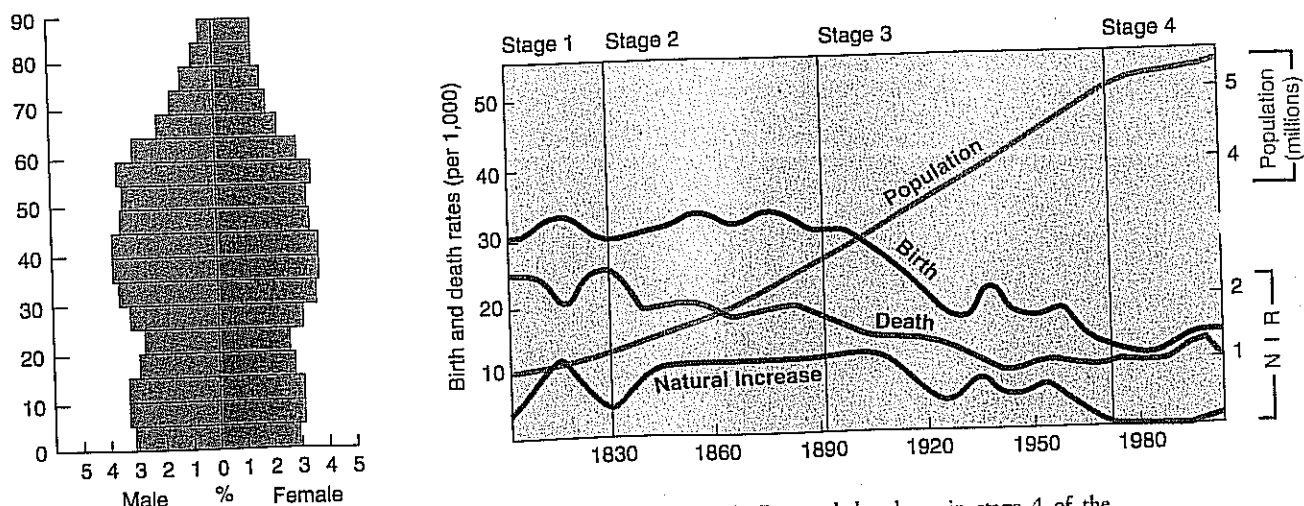


FIGURE 2-19 Demographic transition and population pyramid for Denmark. Denmark has been in stage 4 of the demographic transition and has experienced virtually no change in total population since the 1970s. The population pyramid is much straighter than that of Cape Verde and that of Chile, a reflection of the relatively large percentage of elderly people and small percentage of children.



GLOBAL FORCES, LOCAL IMPACTS

Japan's Population Decline

Japan is the most populous country outside Europe and North America to reach stage 4 of the demographic transition. As in other stage 4 countries, Japan has a NIR of approximately zero because crude birth and death rates are nearly equal. A TFR of 1.3 is well below the replacement rate of approximately 2.1.

Like other countries in stage 4, Japan faces an increase in the percentage of elderly people. The country's 2005 census found that 21 percent of the population was over age 65, higher than in any other country, and greater than the percentage under age 15. To reduce the financial burden on the Japanese government of supporting the increasing number of retirees, programs make it more attractive for older people to continue working, to receive more health-care services at home instead of in hospitals, and to

borrow against the value of their homes to pay for health care.

Despite similarities in most demographic measures, Japan faces different impacts from being in stage 4 of the demographic transition than do other countries. Population is expected to increase rapidly in North America and remain about the same in Western Europe during the twenty-first century. As discussed in Chapter 3, the low natural increase in these stage 4 countries will be offset by large-scale immigration from African, Asian, and Latin American countries still in stage 2 or 3 of the demographic transition.

In contrast, Japan's population is expected to decline from 128 million in 2006 to 121 million in 2025 and 100 million in 2050. Japan has traditionally discouraged immigration from elsewhere in Asia. Japanese society, having placed a

high value on social conformity for thousands of years, does not welcome outsiders from other cultural traditions. With few immigrants compared to other stage 4 societies, Japan faces a severe shortage of workers. Rather than increasing immigration, Japan is addressing the labor force shortage primarily by encouraging more Japanese people to work, especially older people and women.

In the long run, more women in the labor force may translate into an even lower birth rate and therefore an even lower NIR in the future. Rather than combine work with child rearing, Japanese women are expected to make a stark choice: either marry and raise children or remain single and work. According to the 2005 census, the majority has chosen the work option. More than half of women in the prime childbearing years of 20 to 34 are not married.

diseases. These studies ultimately led to medical advances, such as pasteurization, X-rays, penicillin, and insecticides.

In contrast, the sudden drop in the CDR in Africa, Asia, and Latin America in the twentieth century was accomplished by different means and with less internal effort by local citizens. For example, the CDR on the island of Sri Lanka (then known as Ceylon) plummeted 43 percent between 1946 and 1947. The most important reason for the sharp drop was the use of the insecticide DDT to control the mosquitoes that spread malaria.

European and North American countries invented and manufactured the DDT and trained the experts to supervise its use. The spraying of Sri Lankans' houses and other medical services, which cost only \$2 per person per year, were paid for primarily by international organizations.

Thus Sri Lanka's CDR was reduced by nearly one-half in a single year with no change in the country's economy or culture. Medical technology was injected from Europe and North America instead of arising within the country as part of an economic revolution. This pattern has been repeated throughout Africa, Asia, and Latin America.

Having caused the first break with the past through diffusion of medical technology, European and North American countries now urge other countries to complete the second break with the past—the reduction in the birth rate. However, reducing the CBR is more difficult. A decline in the CDR can be induced through introduction of new technology by outsiders,

but the CBR will drop only when people decide for themselves to have fewer children.

Many LDCs, especially in Asia and Latin America, have moved in recent years to stage 3 of the demographic transition thanks to rapidly declining birth rates. Other countries, especially in Africa, have not yet made this second break with the past and in some cases may be slipping back into stage 1. In the past, stage 2 of the demographic transition lasted for approximately 100 years in Europe and North America, but today's stage 2 countries are being asked to move through to stage 3 in much less time in order to curtail population growth. When European and North American countries were in stage 2, the global population was increasing by only about 6 million per year, compared to 80 million per year now.

KEY ISSUE 4

Why Might the World Face an Overpopulation Problem?

- Malthus on overpopulation
- Declining birth rates
- World health threats